

## Chapter 7, continued

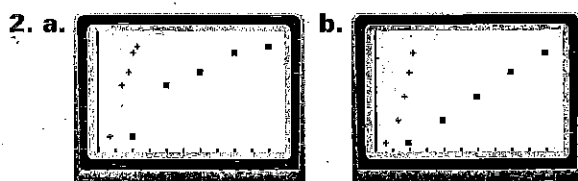
- 15. a.** (4, 1669.34), (10, 2576.29) **b.** principal: \$1250, interest rate: 7.5% **16. a.** 108, 86, 69, 55, 44, 35, 28 **b.**  $y = 135(0.8)^x$ ; Answers will vary. **c.** the ninth week **d.** 2 min

### SAT/ACT Chapter Test

- 1. B 2. C 3. A 4. A 5. A 6. C 7. D 8. E**  
**9. A 10. B 11. E 12. A 13. A 14. C**  
**15. 71 16. 9 17. 8**

### Alternative Assessment

**1.** Complete answers should include: an explanation that because  $\log_b y = x$  is equivalent to  $b^x = y$  and there is no power  $x$  that will make  $b^x$  negative,  $y$  must be positive; two examples (one with  $x$  being negative and one with  $x$  being a fraction between 0 and 1) that support the claim that  $y$  must be positive.



**c.**  $v_1(t)$ : power function;  $v_2(t)$ : exponential function **d.** *Sample answer:* You can use the linear regression feature of a graphing calculator to see which sets of data in parts (a) and (b) have a larger correlation coefficient. **e.** *Sample answer:*

$v_1(t) = 250t^{0.06}$ ;  $v_2(t) = 177(1.09)^t$   
**f.** *Sample answer:*  $v_1(7) \approx \$281,000$ ;  
 $v_2(7) \approx \$324,000$  **g.** 21 years **h.** *Sample answer:* 2000; You can find the solution graphically by finding the intersection of the graphs of  $v_1(t)$  and  $v_2(t)$  and algebraically by setting  $v_1(t)$  equal to  $v_2(t)$ ; Setting  $v_1(t)$  and  $v_2(t)$  equal results in an equation for which it is difficult to isolate  $t$ .

The variable  $t$  is a base on one side of the equation and an exponent on the other. In part (g), the equation is easily solved by taking each side of the equation to the reciprocal power.

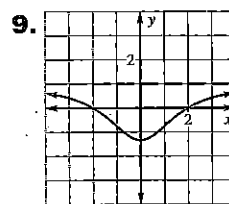
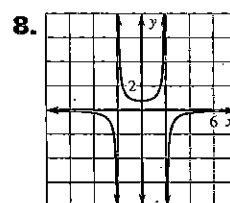
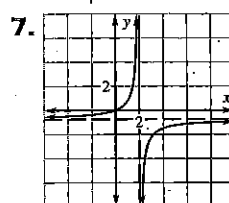
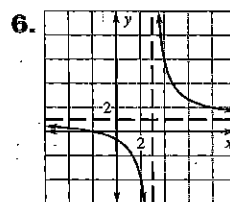
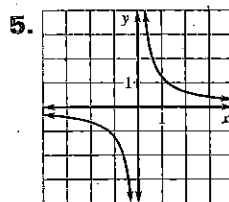
**i.** *Sample answer:* The value of the first house increased less and less over time, while the value of the second house increased more and more over time; The location of the houses can greatly affect their values. Factors, such as population growth/decline, economic development, reassessment, and surrounding development, all contribute to a home's value.

## Chapter 8

### Quiz 1

**1.**  $y = \frac{14}{x}$ , -7 **2.**  $y = -\frac{24}{x}$ , 12 **3.**  $y = -\frac{6}{x}$ , 3

**4.**  $y = \frac{9}{x}$ , -4.5



**10.**  $z = 4xy$ ; 192

### Quiz 2

**1.**  $\frac{2(x-5)}{x(x+4)}$  **2.**  $\frac{x-3}{x+2}$  **3.**  $\frac{(x+2)(x+3)}{(x-5)(x+4)}$

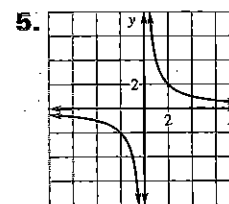
**4.**  $\frac{2x}{x^2-9}$  **5.**  $\frac{x+20}{x^2-2x-8}$  **6.**  $\frac{8x+28}{x^2-64}$

**7.** 0, 6 **8.** 2 **9.** -2 **10.**  $\frac{4}{3x}$

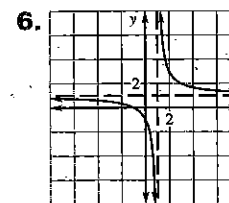
### Chapter Test A

**1.** neither **2.** indirect variation

**3.**  $z = -2xy$ ; -12 **4.**  $z = -3xy$ ; -18



domain: all real numbers except 0, range: all real numbers except 0

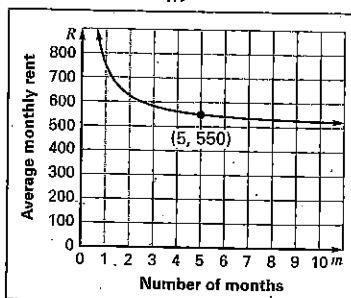


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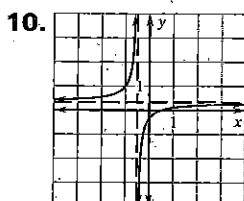
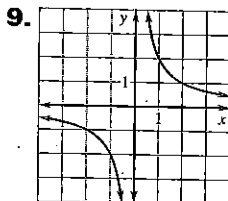
## Chapter 8, continued

7.  $R(m) = \frac{250}{m} + 500, m \geq 1;$

; 5 months



8. \$300; \$100



9.  $\frac{x-4}{x+2}$  12.  $\frac{x+3}{x+4}$  13.  $\frac{2x}{y}$

14.  $\frac{2}{(x-2)(x+5)}$  15.  $20x(x-1)(x+1)$

16.  $x(x-5)(x+5)(x+2)$  17.  $\frac{21x+8}{12x^2}$

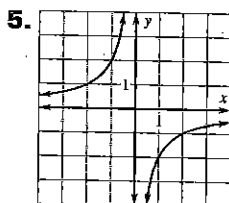
18.  $\frac{4x^2-9x+10}{(x-2)(x+2)^2}$  19. 6 20. -2, 9 21. 6, 8

22. 0, 4

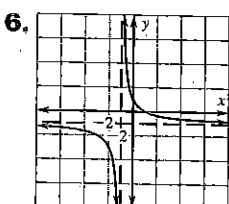
## Chapter Test B

1.  $y = \frac{12}{x}; 6$  2.  $y = -\frac{8}{x}; -4$  3.  $z = -xy; -6$

4.  $z = -4xy; -24$



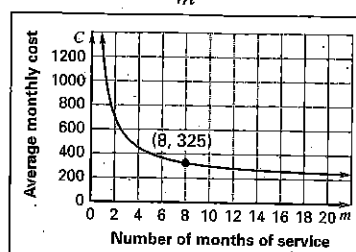
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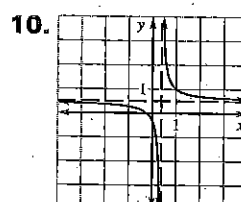
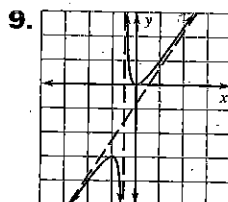
; domain: all real numbers except -1, range: all real numbers except -1

7.  $C(m) = \frac{1000}{m} + 200, 1 \leq m \leq 25;$

; 8 months



8. \$1850; \$600



11. not possible 12.  $\frac{x}{x+1}$  13.  $\frac{x}{2}$  14.  $\frac{2x}{3y}$

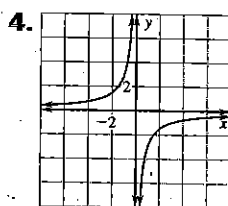
15.  $(x+1)(x+3)(x-3)$  16.  $x(x-4)^2$

17.  $\frac{1}{15x}$  18.  $\frac{4x^2+3x+3}{(x^2-1)(x+4)}$  19. -1, 3

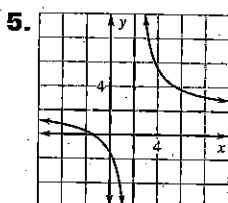
20.  $-1, \frac{1}{2}$  21. -1, 2 22.  $-3, \frac{1}{4}$

## Chapter Test C

1.  $z = \frac{ax}{y}$  2.  $r = aqst$  3.  $w = \frac{ax}{yz}$



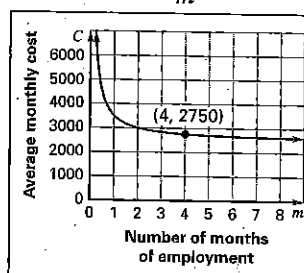
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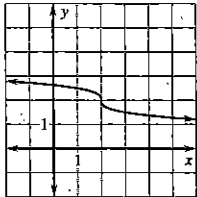
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6.  $C(m) = \frac{1000}{m} + 2500, m \geq 1;$

; 4 months

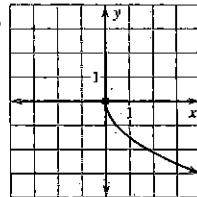


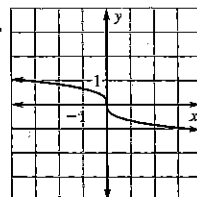
## Chapter 6, continued

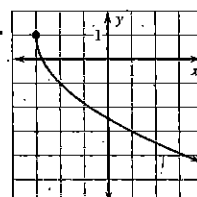
21. ; domain: all real numbers;  
range: all real numbers

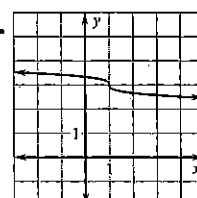
22. 10 23. 25 24. 3 25. 1

### Chapter Test C

1. 3 2. 3 3. -5 4. 10.71 5. 11 6.  $3\sqrt{7}$   
7.  $\frac{4\sqrt{6}}{9}x$  8.  $2x^3$  9.  $3 - x^3$ ; all real numbers  
10.  $-x^5 + x^4 + 3x^3 - 3x^2$ ; all real numbers  
11.  $-x^6 + 2x^5 - x^4 + 3$ ; all real numbers  
12.  $f^{-1}(x) = \sqrt[3]{\frac{7x-3}{2}}$  13.  $g^{-1}(x) = \sqrt[4]{x-5}$   
14.  $K = \frac{5}{9}(F + 459.67)$ ;  $188.15^\circ\text{K}$   
15.  $f(g(x)) = x$ ,  $g(f(x)) = x$   
16.  $f(g(x)) = x$ ,  $g(f(x)) = x$   
17. ; domain:  $x \geq 0$ ; range:  $y \leq 0$

18. ; domain: all real numbers;  
range: all real numbers

19. ; domain:  $x \geq -3$ ;  
range:  $y \leq 1$

20. ; domain: all real numbers;  
range: all real numbers

21. -8 22. 4 23. 3 24. 5

### Standardized Test

1. A 2. B 3. B 4. C 5. B 6. A 7. B

8. D 9. C 10. C 11. C 12. D 13. D

14. B 15. 13 16.  $A(x) = x(x - 5)$ ; 13 ft by 8 ft

17. a.  $C(x) = 4x + 2250$  b.  $f(x) = 1.10x$   
c.  $f(C(x))$ , because the 10% increase will not  
affect the \$2250 otherwise. d. before: \$402,250;  
after: \$442,475

### SAT/ACT Chapter Test

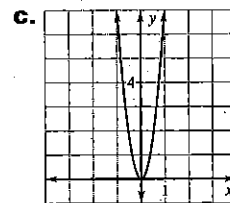
1. B 2. A 3. C 4. A 5. E 6. C 7. D 8. E  
9. C 10. B 11. B 12. A 13. D 14. E

15. D 16.  $\frac{1}{27}$  17.  $\frac{1}{3}$  18. 2

### Alternative Assessment

1. Complete answers should include:  
an explanation that because the properties of  
radicals require two radicals to have the same  
index, students often think that it is not possible  
to multiply or divide two radicals with different  
indices; an explanation that rewriting both  
radicals in rational exponent form allows for the  
application of the product or quotient property;  
two examples that illustrate how to use rational  
exponents to multiply and divide two radicals  
with different indices.

2. a.  $A_1(x) = 6x^2$ ;  $A_2(x) = x^2$  b.  $A(x) = 7x^2$



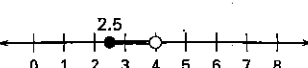
From the graph, you can see that  $A$  fails the  
horizontal line test. d. *Sample answer:* If you  
restrict the domain of  $A$  to nonnegative real  
values of  $x$  ( $x \geq 0$ ), then  $A^{-1}$  is a function. This  
restriction makes sense because  $x$  represents the  
side length of the square runway, which cannot  
be negative.

e.  $x = \sqrt{\frac{1}{7}A}$ ; The inverse function gives the side  
length of the runway in terms of the area of the  
entire stage. f. Runway: 10 ft by 10 ft, Main part  
of stage: 30 ft by 20 ft

## Chapters 1-6

### Cumulative Test

1. \$2.50 2. 70 3.  $-6x - 17$  4. -1.5 5. 22 h

6.  $2.5 \leq x < 4$ ; 

## Chapter 11, continued

4.  $\bar{x}$ : 16.9, median: 16.5, mode: 16, 18, range: 7,  $\sigma$ : 2.17;  $\bar{x}$ : 18.9, median: 18.5, mode: 18, 20, range: 7,  $\sigma$ : 2.17

5.  $\bar{x}$ : 22.1, median: 22, mode: 21, 23, range: 7,  $\sigma$ : 2.30;  $\bar{x}$ : 23.8, median: 24.2, mode: 23.1, 25.3, range: 7.7,  $\sigma$ : 2.52 6.  $\bar{x}$ : 340.5, median: 340, mode: none, range: 127,  $\sigma$ : 43.3;  $\bar{x}$ : 425.6, median: 425, mode: none, range: 158.75,  $\sigma$ : 54.1

7. 0.08 8. 0.75 9. 0.02 10. self-selected; unbiased 11. 5.6% 12. 5.9% 13. 2500

14. 494 15. 625 people

16.  $y = -0.003x^2 + 1.86x - 98$

17.  $y = 0.545 \cdot 3.43^x$  18.  $y = 2.88x + 41.7$

### Standardized Test

1. C 2. B 3. D 4. A 5. A 6. C 7. B

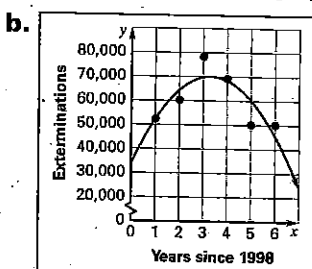
8. C 9. D 10. B 11. B 12. C 13. B

14. D 15. 1.4

16. a. Answers and explanations will vary.

b. Answers and explanations will vary.

17. a. See part (b) for graph.; quadratic



$y = -3,354.57x^2 + 22,054.77x + 33,777.80$   
c. 23,787

### SAT/ACT Chapter Test

1. C 2. B 3. A 4. D 5. C 6. E 7. B 8. D

9. A 10. E 11. E 12. B 13. 67.5 14. 0.80

15. 0.95

### Alternative Assessment

1. Complete answers should include: an explanation that a measure of central tendency represents the center or middle of a set of data values, while a measure of dispersion indicates how spread out the data values are; a real-life example of a data set with a mean that does not represent a typical data value, usually due to an outlier; an explanation that an outlier often has a greater effect on the mean than on the median or mode.

2. a. Convenience sample; *Sample answer:*

The sample is biased because students on student council may be more motivated, higher-achieving students who would prefer a broader range of electives over extra study time.

b. 16 students;  $\pm 25\%$ ; *Sample answer:* No. A margin of error that large will probably make it impossible to determine a majority opinion.

c. *Sample answer:* No. A margin of error of  $\pm 2\%$  requires a sample size of 2500, which is more students than attend the school. One quarter of the student body is 435 students. The least margin of error possible for a survey with that sample size is  $\pm 5\%$ . d. *Sample answer:* The student council could use a computer to randomly generate 435 student ID numbers to determine which students to survey. e. *Sample answer:* No. Because the margin of error is  $\pm 5\%$ , the exact percent of the student body who wants study halls and limited electives is likely between 41% and 51%.

Similarly, the exact percent of the student body who wants no study halls and a broad range of electives is likely between 49% and 59%. The overlap in the intervals makes it impossible to determine for sure what the majority of the student body prefers.

## Chapter 12

### Quiz 1

1. 10,  $a_n = 2n$  2. 10,  $a_n = n + 5$

3.  $\frac{5}{6}$ ,  $a_n = \frac{n}{n+1}$  4. 12 5. 34 6.  $\frac{25}{12}$

7.  $a_n = -4 + 5n$ ,  $a_{10} = 46$ ,  $S_{10} = 235$

8.  $a_n = 3(3)^{n-1}$ ,  $a_{10} = 59,049$ ,  $S_{10} = 88,572$

9.  $a_n = 4n - 9$ ,  $a_{10} = 31$ ,  $S_{10} = 130$

10.  $a_n = 18 + 2n$

### Quiz 2

1. 5 2.  $\frac{8}{5}$  3. sum doesn't exist,  $|r| > 1$

4.  $\frac{4}{9}$  5.  $\frac{1300}{99}$  6. 3, 8, 13, 18, 23

7. 2, 5, 7, 12, 19 8.  $a_1 = 4$ ,  $a_n = a_{n-1} + 6$

9.  $a_1 = 3$ ,  $a_2 = 4$ ,  $a_n = a_{n-1} \cdot a_{n-2}$

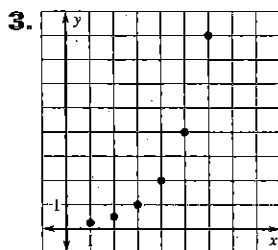
10.  $a_1 = 5$ ,  $a_n = 3(a_{n-1})$  11. -5, 9, -19

12. -3, -13, -63 13. 120 in.

### Chapter Test A

1. 4, 5, 6, 7, 8, 9 2. 0, 3, 8, 15, 24, 35

## Chapter 12, continued



4.  $\sum_{n=0}^5 3n - 4$  5. no 6.  $a_n = 8n - 5$ ; 155  
 7.  $a_n = 6n - 19$  8. 56  
 9.  $a_n = 1.7 + 0.05n$ ; 15 m 10. yes  
 11.  $a_n = -(-3)^n$ ; 2187 12. 86 13. 9 14.  $\frac{1}{3}$   
 15.  $\frac{7}{9}$  16. 3, 6, 12, 24, 48  
 17.  $a_1 = 11$ ,  $a_n = a_{n-1} + 22$   
 18.  $a_1 = \frac{1}{3}$ ,  $a_n = 9a_{n-1}$  19. 3, 7, 15  
 20.  $a_1 = 60$ ,  $a_n = 1.2a_{n-1} - 15$ ; about 21.25

### Chapter Test B

1. -3, -2, -1, 0, 1, 2 2. 0, 2, 6, 12, 20, 30  
 3.  $\sum_{n=0}^4 10n - 5$  4. 84 5. yes  
 6.  $a_n = 7n - 5$ ; 107 7.  $a_n = 3n + 8$  8. 45  
 9. yes 10.  $a_n = \frac{1}{2}(-2)^{n+1}$ ; 128 11.  $\frac{422}{81}$   
 12.  $a_n = 144\left(\frac{7}{8}\right)^{(n-1)}$ ; \$64.63 13. 8 14. 1  
 15.  $\frac{23}{99}$  16. -2, -6, -18, -54, -162 17. 494  
 18.  $a_1 = 7$ ,  $a_n = 13 + a_{n-1}$   
 19.  $a_1 = 27$ ,  $a_n = \frac{4}{3}a_{n-1}$  20. 4, 9, 64

### Chapter Test C

1. 1, 3, 9, 27, 81, 243 2. -1, 0,  $\frac{1}{9}$ ,  $\frac{1}{8}$ ,  $\frac{3}{25}$ ,  $\frac{1}{9}$   
 3.  $\sum_{n=1}^5 \frac{n}{2n+1}$  4. 210 5. yes  
 6.  $a_n = \frac{2}{3} + \frac{8}{3}n$ ; 46 7.  $a_n = 110 - 17n$   
 8. 0 9. no 10.  $a_n = 729(3)^{1-n}$ ; 1 11.  $\frac{61,741}{3125}$   
 12.  $a_n = 29(1.03)^{n-1}$ ; 36.7°C 13. does not exist  
 14.  $\frac{1}{2}$  15.  $\frac{152}{333}$  16. 256, 192, 144, 108, 81  
 17. yes; 56.67 million carats  
 18.  $a_1 = 3$ ,  $a_n = a_{n-1} + 2^{n-1}$

19.  $a_1 = -4$ ,  $a_n = a_{n-1} - (-2)^{n+1}$   
 20. 2, -5, 128

### Standardized Test

1. C 2. B 3. D 4. C 5. B 6. D 7. B 8. C  
 9. B 10. D 11. A 12. C 13. C 14. D  
 15. 9 16. a.  $a_n = 0.4n$ ;  $a_n = a_{n-1} + 0.4$   
 b. 155 psi 17. a. Answers will vary; 5%  
 b.  $a_0 = \$1100$ ; It is the initial amount invested.  
 c.  $a_n = 1100(1.05)^n$  d. \$1474.11

### SAT/ACT Chapter Test

1. A 2. D 3. E 4. C 5. B 6. C 7. D  
 8. A 9. B 10. E 11. D 12. E 13. B  
 14. 1256 15. 2600 16.  $\frac{3}{11}$

### Alternative Assessment

1. Complete answers should include: an explanation that in an arithmetic sequence, the difference between consecutive terms is constant and in a geometric sequence, the ratio of any term to the previous term is constant; an example of a sequence that is both arithmetic and geometric (i.e., a sequence with a common difference of 0 and a common ratio of 1). 2. a. geometric  
 b. 100 yd c.  $a_1 = 100$ ,  $a_n = 0.5a_{n-1}$   
 d. 3.125 yd e.  $a_n = 100(0.5)^{n-1}$  f. about 0.195 yd g. *Sample answer:* It is more convenient to determine the distance of a particular shot using an explicit rule, especially for larger values of  $n$ , because you do not need to know the previous term(s) of the sequence.  
 h. fifth shot; sixth shot i. *Sample answer:* Because a geometric series is the expression formed by adding the terms of a geometric sequence, it represents the sum of the distances of each shot, or the total distance traveled by the ball. No. Yes. Using a finite geometric series, the total distance will always be less than 200 yards. Using an infinite geometric series, the total distance will be the sum of the series, or 200 yards.

## Chapter 13

### Quiz 1

1.  $B = 50^\circ$ ,  $b = 15.49$ ,  $c = 20.22$  2.  $A = 35^\circ$ ,  
 $a = 10.50$ ,  $c = 18.31$  3.  $A = 24^\circ$ ,  $b = 20.21$ ,  
 $c = 22.13$  4.  $A = 53^\circ$ ,  $a = 14.38$ ,  $b = 10.83$   
 5. *Sample answer:*  $485^\circ$ ,  $-235^\circ$   
 6. *Sample answer:*  $640^\circ$ ,  $-80^\circ$